

observed even at a temperature of -40°C . The unfrozen fluid is not water, but a concentrated solution of salt thrown out by the freezing of the ice beneath.

When summer begins, the thawing that occurs is very local and unequal. Any dark body, such as a heap of ashes or the droppings of bears, eats its way into the snow, absorbing the rays of heat which are reflected off again by the general white surface. The bear droppings eat their way into the snow, and then into the ice, and the conical hole thus formed fills itself with water. It may, at last, eat its way right through the ice where not very thick. Thus are formed the greater part of those holes in drift-ice which are usually ascribed to seals. The author never saw a seal's hole in winter.

A number of interesting experiments were made on ice phenomena. For example, on March 5, a cube of ice was sunk under the ice-field to a depth of five metres. After a lapse of twenty-four hours it was found that a crust of new ice had formed itself over it about 1 cm. thick. This was caused by the low temperature of the block itself and, from a similar cause, ice-crystals had formed between the edges of the hole; owing to the coldness of its walls. On March 10 very little increase in the added layer of ice on the cube was to be observed. On March 20 this newly-formed ice was found to be softened so that it was easily impressed by the finger; by April 2 it had become harder again, though porous and apparently a little increased. From thence onwards the block dwindled regularly, especially on that part of its surface which was turned upwards; on July 18 it was only a third of its original size; nevertheless, the hole through which it was sunk had, during the last period, become entirely closed by young ice at its lower margin. This experiment shows the loss of ice from below by the action of the warmth of the water. The author concludes from his experiments and measurements that compact salt-water ice can never attain a greater thickness than 10 metres.

Icebergs are subjected to disintegration after somewhat the same manner as rocks so commonly are. They are full of crevasses, into which the water formed by melting penetrates; in winter this water freezes, and by its expansion all through the glacier a rupture of the mass ensues. "It is highly probable that most of the icebergs afloat in winter are in such a condition that a very slight cause is sufficient to make them burst because of their state of internal tension. . . . Every polar traveller can tell how a shot, the driving-in of an ice-anchor, or any other sudden vibration, has brought about the catastrophe; cases have even occurred in which the sound of the voice alone was sufficient. An iceberg is always an unpleasant neighbour." So many are the causes which tend to destroy icebergs that the author concludes "no berg exists which could withstand them more than ten years, and that commonly the life of a berg is much shorter." However this may be, doubtless the much larger Antarctic bergs last very much longer, as must necessarily occur because of the much greater uniformity of the climate to which they are exposed.

With regard to glaciers, the author quotes an interesting observation of Kane's to the effect that even in lat. $78^{\circ}20'$ during the entire winter, however low be the temperature, the glacier streams never dry up. The melting which

supplies them with water can only derive its requisite heat from the friction of the ice-masses.

The chapter on the ice-movements is full of interest. Every field acted on by winds and currents has its own peculiar velocity, depending on the dimensions of the irregularities above and those of the resistances below, in which no two fields are alike. From these differences of velocity arise the irresistible pressures between contiguous fields. The iceberg deeply sunk drifts but slowly, whilst the ice field may travel very fast. If the field catches up a berg in its course, it is broken and torn by the berg; and as it proceeds on its course its broken fragments are piled up block upon block on the coast of the iceberg. To a casual observer it appears as if the iceberg, driven by a counter current below, were being forced in the opposite direction to the ice-field, so as to plough it up. Many groundless accounts of the existence of such counter currents thus observed have been circulated.

Another cause of pressure between ice-fields is that, owing to the irregularities on their surfaces, they are twisted round by the action of the wind, which takes hold more on some regions than others. Every field is differently thus acted upon for each direction of the wind. A similar effect is caused by the currents beneath acting upon the irregularities of the under surface. So various are the movements in the ice-fields, that even when the ice lies all the while closed, it is very seldom that any two pieces remain for any length of time in the same position alongside one another. Two ships beset together by the ice are sure sooner or later to be separated.

The author fully admits that the danger incurred by explorers in the Antarctic regions is very much greater than that to which Arctic voyagers are exposed. The fog in the south is a terrible enemy, and there a ship cannot at once take refuge in the field-ice as in the north. He urges, however, the necessity for scientific Antarctic exploration and observation, and suggests that a wintering in the lands lying south of Cape Horn could be easily accomplished, and would not require any very extensive appliances. We fully agree as to the benefit to be derived by science from a round of meteorological observations and all other kinds of scientific exploration in the Antarctic regions, and heartily wish that such enterprise would take the place of the constant struggles to get to the North Pole. By the mere reaching of the pole there is nothing to be attained. A steamship could very possibly run down from New Zealand direct to Mount Erebus and Terror in a fortnight during the summer months; such an attempt has never been made. It need not be very costly, and possibly the Government of one of the Australian colonies may make it some day. We commend Karl Weyprecht's book to all who study ice phenomena, but not only to specialists, for it is full of interest to all intelligent readers. H. N. MOSELEY

THE SILK GOODS OF AMERICA

The Silk Goods of America. By Wm. C. Wyckoff. (New York: Van Nostrand.)

THIS book has been issued under the auspices of the Silk Association of America, with the view of affording information as to the character of the silk goods manufactured in that country. Not many years since

nearly all such goods were imported, and even now the entire product of many of the American silk mills is represented to the consumer as of European make. The Silk Association have, however, bestirred themselves; they find that in order to obtain a standing in a market where imported articles hold an established reputation they are obliged to make better fabrics than their foreign rivals, and, naturally enough, they now seek to secure for themselves the credit of their enterprise. The Centennial Exhibition startled the manufacturers both of this country and of France with the extent and rapidity of their progress in developing this special branch of industry. The railways across the Continent and the direct trade with Asia across the Pacific Ocean have placed America more nearly on a level with European countries as regards supplies of raw silk; improvements in the power-loom and the continuance of the tariff policy of the Government have done the rest. Mr. Wyckoff boldly states that had that policy vacillated during the last ten or fifteen years there would have been no story of improvement to tell.

One of the main difficulties with which the American manufacturer had to contend was the want of skilled labour, and this was more especially felt in the production of black dress goods. On account of the necessity of securing perfect equality in the threads, such goods are far more difficult to produce than are more highly ornamented fabrics, but although the manufacture of broad black silks on anything like a large scale has only been attempted in America during the last half-dozen years it is estimated that fully a third of the plain silks and a much larger proportion of the brocade silks which are consumed in that country are made there. Indeed Mr. Wyckoff states that the advance in this branch of manufacture within the last three years is greater than that in any other department of American silk industry. Nor is the reason for this far to seek. The American manufacturers, as a class, have studiously set their faces against the abominable system of "loading" which prevails so largely on this side the Atlantic. Nearly all European broad black silks are doubled, nay, sometimes even trebled, in weight in the dyeing of the yarn. This is how the "Black Art" is practised in France. The yarn is repeatedly dipped in nitrate of iron until sufficiently weighted, after which it is passed through a bath of prussiate of potash and then treated with gambier and acetate of iron. To brighten it it is next passed through a logwood bath and well soaped; if it is to be soft and satin-like it is oiled and treated with soda; if it is to be stiff and rustling it is dipped in acid. No wonder after this that the black silk with its load of grease and iron wears shiny, and cracks in the folds. "It is asking too much to demand that the few strands shall act as iron-mine, soap-factory, and chemical laboratory all at once and stand the wear of practical use besides. These are requirements before which the English attempt to make a grocery store out of a shirt pattern is a simple and ordinary matter." Nothing is easier, however, than to discover this loading of dye-stuff. If ladies would insist on being allowed to test a small sample of the silk, at home, before purchasing, by the very simple operation of burning it, the sophistication would speedily perish. Pure silk crisps instantly on burning, and leaves a small quantity of charcoal; loaded silk smoulders

slowly to a yellow ash. Not many years ago men's coats were largely trimmed with black silk braid; but now, as a maker in the article was heard dolefully to declare, "the trade in black braids is as dead as Julius Cæsar," for we have naturally got disgusted with the frayed and brown appearance which the article generally assumes after a week or two's wear, thanks to the fact that it usually contains more dye-stuff than silk. The public is gradually awakening to a knowledge of these things, just as surely as the patient Hindoo and the heathen Chinese have had their eyes opened to that miserable compound of starch, cotton, China clay, and Epsom salts which the Manchester merchants have palmed off upon them as genuine shirtings.

Let the silk manufacturers take warning: to meet falling markets with inferior goods dressed and dodged so as to simulate a better article is simply to hasten on the time of trouble and disaster. Markets have reputations as tender as that of Cæsar's wife. If such malpractices continue we shall soon be clamouring, in the interests of commercial morality and of national prosperity, for an extension of the Adulteration Act from our Food to our Clothes.

DARWINISM AND OTHER ESSAYS

Darwinism and other Essays. By John Fiske, M.A., LL.B., formerly Lecturer on Philosophy, Instructor in History, and Assistant-Librarian at Harvard University. (London: Macmillan and Co., 1879.)

TO readers of NATURE there is nothing new and little very striking in these essays, and it is only justice to Mr. Fiske to remark that the title of the first, which gives its name to the volume, claims nothing of the sort. The most interesting consideration in the four papers upon the subject is the marvellous way in which every science and line of thought, both in natural history and in human history, have entirely changed their aspect and started in a new direction since the publication of "The Origin of Species." One fourth of the book is a review of Mr. Buckle's "History of Civilisation," written and published by Mr. Fiske when he was nineteen years old: the object of reprinting which now it is hard to see. Yet it is interesting read in immediate juxtaposition with the chapters on Darwinism, for nothing could show so distinctly how high and dry the stream of knowledge has left the whole theory of a work most celebrated only twenty years ago. Buckle's book, the theorem of which was that there is a science of history, the laws of which are as uniform and invariable as those of mechanics or astronomy, if only we could discover and measure all the various forces at work, was an energetic effort in the right direction, and was gladly welcomed by many scientific men of the day. But the key to the puzzle had not then been found. Had Buckle lived in these days, when the works of Darwin, Herbert Spencer, and Sir H. Maine are familiar, he would, no doubt, have built up a far more coherent theory than he did.

In two other papers in this volume we find development working in two very different spheres, viz., in the production of a nation, in the account of "The Races of the Danube," and in the production of a catalogue, in his description of a "Librarian's Work." Had Mr. Fiske